Am

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,780	02/12/2002	Sung-Joo Yoo	18062C-39.10US	1045

20350 7590 11/28/2003

TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER	
BELLO, AGUSTIN	
ART UNIT	PAPER NUMBER
2633	11

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/075,780	**Applicant(s)** YOO, SUNG-JOO	
	Examiner Agustin Bello	**Art Unit** 2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant claims "the modulated optical signal" in line 3. However, it is not clear to which modulated optical signal the applicant is referring.

3. Claim 2 recites the limitation "the optical transducer" and "the modulated optical signal" in lines 2 and 3 respectively. There is insufficient antecedent basis for these limitations in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (U.S. Patent No. 6,525,850) in view of Mizrahi (U.S. Patent No. 6,067,181).

Regarding claims 1 and 6, Chang teaches in an optical communication system, a method for extracting information from a baseband optical signal comprising: applying, to an optical fiber, a subcarrier multiplexed baseband optical signal (column 6 line 25 - column 7 line 30), said subcarrier multiplexed baseband optical signal composed of a modulated optical carrier including a payload without control information (e.g. data payload separate from header

subcarrier, column 6 lines 43-47 and column 7 lines 3-5) and a modulated optical subcarrier including control information without payload (e.g. header information at a subcarrier separated from the data payload column 7 lines 3-5), the modulated optical subcarrier being at a subcarrier frequency which is separated from the modulation bandwidth of the optical carrier (column 7 lines 3-5), receiving the subcarrier multiplexed baseband optical signal, optically separating the modulated optical subcarrier from the modulated optical carrier, then directing the modulated optical subcarrier to an optical energy transducer (column 10 lines 54-60, column 11 lines 18-22, 30-36, column 18 lines 19-41). Chang differs from the claimed invention in that Chang fails to specifically teach using a three port optical circulator coupled to a Bragg grating to separate the modulated optical subcarrier from the modulated optical carrier by receiving the subcarrier multiplexed baseband optical signal at an input port of an optical circulator; applying the subcarrier multiplexed baseband optical signal via an extraction port of the optical circulator to a fiber Bragg grating; optically separating the modulated optical subcarrier in the fiber Bragg grating while reflecting the modulated optical carrier back to the extraction port of the optical circulator; and outputting the modulated optical carrier to an output port of the optical circulator. However, separating signals of a multiplexed signal via a three-port circulator coupled to a Bragg grating is very well known in the art. Mizrahi teaches a system wherein a multiplexed signal is received at an input port of an optical circulator (reference numeral 32 in Figure 1); applied via an extraction port (reference numeral 33 in Figure 1) of the optical circulator to a fiber Bragg grating (reference numeral 40 in Figure 1); the signal to be separated then being optically separating in the fiber Bragg grating while the signal to be propagated along the optical fiber is reflected back to the extraction port (reference numeral 33 in Figure 1) of the optical

circulator; the signal to be propagated being output to an output port of the optical circulator (reference numeral 34 in Figure 1). One skilled in the art would have been motivated to use the circulator/Bragg grating device of Mizrahi in the system of Chang in order to more efficiently separate the data payload from the subcarrier signal of the header. One skilled in the art would also have recognized that use of the device of Mizrahi in the system of Chang, for instance at the output of the dispersion compensator (reference numeral 1205 in Figure 12), would have eliminated the need for the elements in Chang which serve to filter out the data payload from the subcarrier frequency (e.g. filter 930 in Figure 9) and vice-versa (e.g. filter 830 in Figure 8), thereby reducing the overall cost of the system of Chang. Furthermore, it is clear that the device of Mizrahi could have easily been incorporated in to the system of Chang without departing from the scope of the invention of Chang. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have incorporated the optical circulator and Bragg grating arrangement of Mizrahi into the system of Chang in order to efficiently separate the subcarrier from the data payload at less cost.

Regarding claim 2, Chang teaches the method according to claim 1 further comprising: outputting a modulated electrical signal (reference numeral 1211 in Figure 12) from the optical transducer (reference numeral 1210 in Figure 12) which is proportional to modulation of the modulated optical signal; and detecting the information which modulated the electrical signal (reference numeral 1223 in Figure 12).

Regarding claims 3 and 8, Chang teaches in an optical communication system, a method for swapping control information of a baseband optical signal comprising: applying, to an optical fiber, a subcarrier multiplexed baseband optical signal (column 6 line 25 - column 7 line 30),

said subcarrier multiplexed baseband optical signal composed of a modulated optical carrier including a payload without control information (e.g. data payload separate from header subcarrier, column 6 lines 43-47 and column 7 lines 3-5) and a modulated optical subcarrier including control information without payload (e.g. header information at a subcarrier separated from the data payload column 7 lines 3-5), the modulated optical subcarrier being at a subcarrier frequency which is separated from the modulation bandwidth of the optical carrier (column 7 lines 3-5), receiving the subcarrier multiplexed baseband optical signal, optically separating the modulated optical subcarrier from the modulated optical carrier, directing the modulated optical subcarrier to an optical energy transducer (column 10 lines 54-60, column 11 lines 18-22, 30-36, column 18 lines 19-41), then applying the modulated optical carrier to an optical modulator adapted for writing new subcarrier modulated control information (column 21 lines 51-62). Chang differs from the claimed invention in that Chang fails to specifically teach using a three port optical circulator coupled to a Bragg grating to separate the modulated optical subcarrier from the modulated optical carrier by receiving the subcarrier multiplexed baseband optical signal at an input port of an optical circulator; applying the subcarrier multiplexed baseband optical signal via an extraction port of the optical circulator to a fiber Bragg grating; optically separating the modulated optical subcarrier in the fiber Bragg grating while reflecting the modulated optical carrier back to the extraction port of the optical circulator; and outputting the modulated optical carrier to an output port of the optical circulator. However, separating signals of a multiplexed signal via a three-port circulator coupled to a Bragg grating is very well known in the art. Mizrahi teaches a system wherein a multiplexed signal is received at an input port of an optical circulator (reference numeral 32 in Figure 1); applied via an extraction port (reference

numeral 33 in Figure 1) of the optical circulator to a fiber Bragg grating (reference numeral 40 in Figure 1); the signal to be separated then being optically separating in the fiber Bragg grating while the signal to be propagated along the optical fiber is reflected back to the extraction port (reference numeral 33 in Figure 1) of the optical circulator; the signal to be propagated being output to an output port of the optical circulator (reference numeral 34 in Figure 1). One skilled in the art would have been motivated to use the circulator/Bragg grating device of Mizrahi in the system of Chang in order to more efficiently separate the data payload from the subcarrier signal of the header. One skilled in the art would also have recognized that use of the device of Mizrahi in the system of Chang, for instance at the output of the dispersion compensator (reference numeral 1205 in Figure 12), would have eliminated the need for the elements in Chang which serve to filter out the data payload from the subcarrier frequency (e.g. filter 930 in Figure 9) and vice-versa (e.g. filter 830 in Figure 8), thereby reducing the overall cost of the system of Chang. Furthermore, it is clear that the device of Mizrahi could have easily been incorporated in to the system of Chang without departing from the scope of the invention of Chang. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have incorporated the optical circulator and Bragg grating arrangement of Mizrahi into the system of Chang in order to efficiently separate the subcarrier from the data payload at less cost.

Regarding claim 4, Chang teaches a method for controlling the propagation path of a baseband optical signal comprising: applying, to an optical fiber, a subcarrier multiplexed baseband optical signal (column 6 line 25 - column 7 line 30), said subcarrier multiplexed baseband optical signal composed of a modulated optical carrier including a payload without control information (e.g. data payload separate from header subcarrier, column 6 lines 43-47 and

column 7 lines 3-5) and a modulated optical subcarrier including control information without payload (e.g. header information at a subcarrier separated from the data payload column 7 lines 3-5), the modulated optical subcarrier being at a subcarrier frequency which is separated from the modulation bandwidth of the optical carrier (column 7 lines 3-5), receiving the subcarrier multiplexed baseband optical signal at the input to a routing element (e.g. network elements in the system), optically separating the modulated optical subcarrier from the modulated optical carrier, directing the modulated optical subcarrier to an optical energy transducer (column 10 lines 54-60, column 11 lines 18-22, 30-36, column 18 lines 19-41), changing the wavelength of the optical carrier for the payload in response to the control information (column 17 lines 3-15); and directing the optical carrier for the payload along one of a plurality of output paths from the routing element responsive to the control information (column 17 lines 3-15). Chang differs from the claimed invention in that Chang fails to specifically teach using a three port optical circulator coupled to a Bragg grating to separate the modulated optical subcarrier from the modulated optical carrier by receiving the subcarrier multiplexed baseband optical signal at an input port of an optical circulator; applying the subcarrier multiplexed baseband optical signal via an extraction port of the optical circulator to a fiber Bragg grating; optically separating the modulated optical subcarrier in the fiber Bragg grating while reflecting the modulated optical carrier back to the extraction port of the optical circulator; and outputting the modulated optical carrier to an output port of the optical circulator. However, separating signals of a multiplexed signal via a three-port circulator coupled to a Bragg grating is very well known in the art. Mizrahi teaches a system wherein a multiplexed signal is received at an input port of an optical circulator (reference numeral 32 in Figure 1); applied via an extraction port (reference numeral

33 in Figure 1) of the optical circulator to a fiber Bragg grating (reference numeral 40 in Figure 1); the signal to be separated then being optically separating in the fiber Bragg grating while the signal to be propagated along the optical fiber is reflected back to the extraction port (reference numeral 33 in Figure 1) of the optical circulator; the signal to be propagated being output to an output port of the optical circulator (reference numeral 34 in Figure 1). One skilled in the art would have been motivated to use the circulator/Bragg grating device of Mizrahi in the system of Chang in order to more efficiently separate the data payload from the subcarrier signal of the header. One skilled in the art would also have recognized that use of the device of Mizrahi in the system of Chang, for instance at the output of the dispersion compensator (reference numeral 1205 in Figure 12), would have eliminated the need for the elements in Chang which serve to filter out the data payload from the subcarrier frequency (e.g. filter 930 in Figure 9) and vice-versa (e.g. filter 830 in Figure 8), thereby reducing the overall cost of the system of Chang. Furthermore, it is clear that the device of Mizrahi could have easily been incorporated in to the system of Chang without departing from the scope of the invention of Chang. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have incorporated the optical circulator and Bragg grating arrangement of Mizrahi into the system of Chang in order to efficiently separate the subcarrier from the data payload at less cost.

Regarding claim 5, Chang teaches the method according to claim 4 further comprising the step of modulating the directed optical carrier to add a subcarrier containing new control information (column 21 lines 51-62).

Regarding claim 7, Chang teaches the device according to claim 6 wherein the optical energy transducer is a photodetector (reference numeral 910 in Figure 9) for generating a

electrical signal proportional to the signal of the modulated subcarrier and further including: a detector for detecting the information modulating the electrical signal (reference numeral 1223 in Figure 12).

Regarding claim 9, Chang teaches an optical subcarrier receiver according to claim 7; a controller (reference numeral 1250 in Figure 12) for controlling other components in response to the control information extracted by said optical subcarrier receiver; and a tunable optical source (inherent in the wavelength converter taught by Chan, column 25 lines 22-26) coupled to said controller, adapted for emitting an optical signal with a modulation proportional to the modulated optical carrier at a wavelength dictated by the control information on the said control information (column 15 lines 53-67 and column 17 lines 3-18).

Regarding claim 10, Chang differs from the claimed invention in that Chang fails to specifically teach that the tunable optical source comprises: a tunable laser optically coupled to a semiconductor optical amplifier. However, tunable optical source comprising a tunable laser optically coupled to semiconductor optical amplifier is very well known in the art. One skilled in the art would have been motivated to use a tunable optical source comprising a tunable laser optically coupled to semiconductor optical amplifier since both elements are readily available and relatively inexpensive. Furthermore, wavelength converters such as that taught by Chang are well known to employ tunable optical sources comprising tunable lasers and optical amplifiers. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have used a tunable optical source comprising a tunable laser optically coupled to semiconductor optical amplifier.

Regarding claim 11, Chang teaches a wavelength switch (reference numeral 501 in Figure 6) having at least one input and a plurality of outputs, the switch being optically coupled to the tunable optical source (inherent for wavelength conversion taught by Chang) and adapted for directing an optical signal on any of its inputs to a specific output in accordance with the wavelength of the input signal (e.g. wavelength selective crossconnect, column 11 line 15).

Regarding Claim 13, the combination of references differs from the claimed invention in that it fails to specifically teach an array of optical modulators coupled to the outputs of the wavelength switch for modulation of additional information onto the modulated optical carrier. However, modulation of signals is very well known in the art and would have provided a means for transmission of additional information in the system of the combination of references. Furthermore, Chang discloses a modulator that adds information to the modulated optical carrier signal (column 21 lines 51-62). It would have been obvious to one skilled in the art at the time the invention was made to have coupled an array of optical modulators to the outputs of the wavelength switch for modulation of additional information onto the modulated optical carrier to allow for the transmission of additional information. Furthermore, it would have been obvious to have an array of modulators since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.*

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang in view of Mizrahi and Gehler (U.S. Patent No. 6,400,872).

Regarding Claims 12, the combination of Chang and Mizrahi differs from the claimed invention in that it fails to specifically teach that the wavelength switch is an arrayed waveguide

grating, Chang suggests as much in reciting a wavelength selective cross connect (column 11 line 15). Furthermore, a popular type of wavelength selective cross connect is a arrayed waveguide grating. Moreover, arrayed waveguide gratings are very well known in the art and readily available. Gehler teaches such a switch in the form of an arrayed waveguide grating which is capable of directing any of its inputs to a specific output according to the wavelength of the input signal. One skilled in the art would have been motivated to use an arrayed waveguide grating since they are known to provide excellent coupling efficiency. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use an arrayed waveguide grating as taught by Gehler as the wavelength selective cross connect taught by Chang.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

AB

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600